

Claims:

1. A method of modeling a uniform transmission line comprising the steps of:

obtaining measured s-parameters of a connectivity system in combination with said uniform transmission line,

mathematically isolating a representative portion of said uniform transmission line from said connectivity system by identifying an electrical position of a representative portion of said uniform transmission line as distinct from said connectivity system,

adjusting said measured s-parameters to represent s-parameters of only said representative portion of said uniform transmission line, and

extracting Telegrapher's Equation transmission parameters from said adjusted measured s-parameters.

2. A method as recited in claim 1 wherein said connectivity system in combination with said uniform transmission line comprises a connectorized transmission line configuration.
3. A method as recited in claim 1 wherein said connectivity system in combination with said uniform transmission line comprises a probed transmission line configuration.
4. A method as recited in claim 1 wherein said step of obtaining further comprises obtaining measured reflection and transmission s-parameters.
5. A method as recited in claim 4 wherein said step of mathematically isolating further comprises the steps of converting said measured reflection s-parameter to a measured reflection impulse response, identifying first and second

uniform transmission line delineations in said measured reflection impulse response, identifying start and stop gates from said first and second uniform transmission line delineations, establishing a gated reflection impulse response, and converting said gated reflection impulse response to the frequency domain to obtain an adjusted reflection s-parameter.

6. A method as recited in claim 5 wherein said step of adjusting further comprises the steps of:
 - adjusting a phase component of said adjusted reflection s-parameter by shifting a reference plane by an electrical length equal to said start gate,
 - converting said measured transmission s-parameter to a measured transmission impulse response,
 - identifying an electrical length of said connectivity system in combination with said uniform transmission line, and
 - adjusting a phase component of said measured transmission s-parameter by adding an electrical length equal to a difference between said electrical length of said connectivity system in combination with said uniform transmission line and an electrical length between said start and stop gates.
7. A method as recited in claim 6 and further comprising the step of scaling a magnitude component of said measured transmission s-parameter.
8. A method as recited in claim 7 wherein said step of scaling further comprises adjusting said magnitude component of said measured transmission s-parameter by a percentage of the electrical length of said representative portion relative to said electrical length of said connectivity system in combination with said uniform transmission line.

9. A method as recited in claim 1 wherein said Telegrapher's Equation transmission parameters comprise normalized resistance, inductance, capacitance, and admittance values per unit length.
10. A method as recited in claim 1 and further comprising the step of calculating a complex characteristic impedance and complex propagation constant from said Telegrapher's Equation transmission parameters.
11. An apparatus for modeling a uniform transmission line comprising:
 - a measurement system for obtaining measured s-parameters of a connectivity system in combination with said uniform transmission line, and
 - a processor together with program control means for mathematically isolating a representative portion of said uniform transmission line from said connectivity system by identifying an electrical position of representative portion of said uniform transmission line as distinct from said connectivity system, adjusting said measured s-parameters to represent s-parameters of only said representative portion of said uniform transmission line, and extracting Telegrapher's Equation transmission parameters from said adjusted measured s-parameters.
12. An apparatus as recited in claim 11 wherein said connectivity system in combination with said uniform transmission line comprises a connectorized transmission line.

13. An apparatus as recited in claim 11 wherein said connectivity system in combination with said uniform transmission line comprises a probed transmission line.
14. An apparatus as recited in claim 11 wherein said step of obtaining further comprises obtaining measured reflection and transmission s-parameters.
15. A method as recited in claim 14 wherein said program control means for mathematically isolating further comprises means for converting said measured reflection s-parameter to a measured reflection impulse response, means for identifying first and second uniform transmission line delineations in said measured reflection impulse response, means for identifying start and stop gates from said first and second uniform transmission line delineations, means for establishing a gated reflection impulse response, and means for converting said gated reflection impulse response to the frequency domain to obtain an adjusted reflection s-parameter.
16. An apparatus as recited in claim 15 wherein said means for adjusting further comprises
- means for adjusting a phase component of said adjusted reflection s-parameter by shifting a reference plane by an electrical length equal to said start gate,
 - means for converting said measured transmission s-parameter to a measured transmission impulse response,
 - means for identifying an electrical length of said connectivity system in combination with said uniform transmission line, and
 - means for adjusting a phase component of said measured transmission s-parameter by adding an electrical length equal to a difference between said

electrical length of said connectivity system in combination with said uniform transmission line and an electrical length between said start and stop gates.

17. An apparatus as recited in claim 16 and further comprising means for scaling a magnitude component of said measured transmission s-parameter.

18. An apparatus as recited in claim 17 wherein said means for scaling further comprises means for adjusting said magnitude component of said measured transmission s-parameter by a percentage of said electrical length of said representative portion relative to said electrical length of said connectivity system in combination with said uniform transmission line.

19. An apparatus as recited in claim 11 wherein said Telegrapher's Equation transmission parameters comprise normalized resistance, inductance, capacitance, and admittance values per unit length.

20. An apparatus as recited in claim 11 and further comprising the step of calculating a complex characteristic impedance and complex propagation constant from said Telegrapher's Equation transmission parameters.

21. A method of modeling a uniform transmission line comprising the steps of:

obtaining measured reflection and transmission s-parameters of a connectivity system in combination with said uniform transmission line,

converting frequency domain representations of said s-parameters to respective impulse response time domain representations,

identifying a start gate, a stop gate, and an electrical length of said connectivity system and uniform transmission line combination from said time domain representations,

establishing a gated reflection impulse response for only a representative portion of said uniform transmission line as distinct from said connectivity system based upon said start gate and said stop gate,

converting said gated reflection impulse response to a gated reflection s-parameter,

adjusting a phase component of said measured transmission s-parameters to represent s-parameters of only said representative portion of said uniform transmission line,

scaling said magnitude component of said transmission s-parameter as a percentage of electrical length of said representative portion relative to said electrical length of said connectivity system and uniform transmission line combination and

extracting Telegrapher's Equation transmission parameters from said adjusted measured s-parameters.

22. A method as recited in claim 21 wherein said step of adjusting a phase component further comprises the steps of shifting a reference plane of said phase component by an electrical length equal to said start gate.

23. A method as recited in claim 21 wherein said connectivity system in combination with said uniform transmission line comprises a connectorized transmission line.

24. A method as recited in claim 21 wherein said connectivity system in combination with said uniform transmission line comprises a probed transmission line.
25. A method as recited in claim 21 wherein said step of obtaining comprises taking measurements on a vector network analyzer.
26. A method as recited in claim 21 wherein said step of obtaining comprises retrieving measurement data from data storage media.